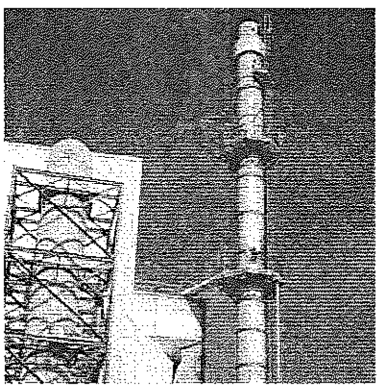
AECOM Environment

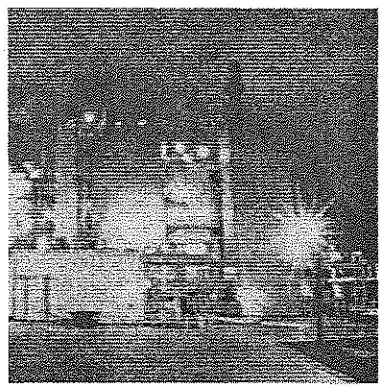
Prepared for:
Heritage-WTI, Inc.
1250 St. George Street
E. Liverpool, Ohio

Prepared by:
AECOM
Chelmsford, MA
60271731.1
July 18 & 19, 2012

Confirmatory Performance Test Final Report and Notification of Compliance for the Rotary Kiln Incinerator

Draft Report





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HERITAGE-WTI®

[PUBLIC COPY]

David Moll

Prepared By: David Moll

Douglas Roeck

Reviewed By: Douglas R. Roeck

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Glossary of Terms and Acronyms

acfm	actual cubic feet per minute
APCS	air pollution control system
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWFCO	automatic waste feed cut-off
Cd	cadmium
CEMS	continuous emission monitoring system
CFR	Code of Federal Regulations
Cl_2	chlorine (gas)
CMS	continuous monitoring system
CO	carbon monoxide
COA	certificate of analysis
CO_2	carbon dioxide
COC	chain of custody
CPT	comprehensive performance test
Cr	chromium
CVAAS	cold vapor atomic absorption spectroscopy
DCS/DAS	data control system / data acquisition system
DI	deionized (water)
DOC	documentation of compliance
DOT	Department of Transportation (U.S.)
DRE	destruction and removal efficiency
dscfm	dry standard cubic feet per minute
dscm	dry standard cubic meter
EDL	estimated detection limit
EPA	Environmental Protection Agency (U.S.)
EMPC	estimated maximum possible concentration
FGCS	flue gas cleaning system
FSAP	Feed stream analysis plan
g/hr	grams per hour
g/sec	grams per second
gr/dscf	grains per dry standard cubic foot
GC/MS	gas chromatography/mass spectrometry
HAPs	hazardous air pollutants

HCl	hydrogen chloride (gas) or hydrochloric acid
Hg	mercury
HOCs	hazardous organic constituents
HRA	hourly rolling average
HRB	heat recovery boiler
HRGC/HRMS	high resolution gas chromatography / high resolution mass spectrometry
HWC	hazardous waste combustor
ICAP	inductively coupled argon plasma
ICP-MS	inductively coupled plasma mass spectrometry
ID	induced draft (fan)
IDL	instrument detection limit
in. w.c.	inches water column (pressure)
LCS/LCSD	laboratory control sample/ laboratory control sample duplicate
lb/hr	pounds per hour
LVM	low volatile metals (arsenic, beryllium and chromium)
MACT	maximum achievable control technology
MDL	method detection limit
μg	micrograms
mg	milligrams
mg/kg	milligrams per kilogram
MS/MSD	matrix spike / matrix spike duplicate
ND	non-detect or not detected
NDIR	non-dispersive infrared
NELAC	National Environmental Laboratory Accreditation
NESHAPs	National Emission Standards for Hazardous Air Pollutants
ng	nanograms
NIST	National Institute of Standards and Technology
NOC	Notification of Compliance
NO_x	oxides of nitrogen
OEPA	Ohio Environmental Protection Agency
OMA	one minute average
O&M	operation and maintenance
OPL	operating parameter limit
OTC	operator training and certification
O_2	oxygen

Pb	lead
PCC	primary combustion chamber
PCDDs	polychlorinated dibenzo-p-dioxins
PCDFs	polychlorinated dibenzofurans
pg	picograms
PET	performance evaluation test
PLC	programmable logic controller
P&ID	process and instrumentation diagram
PM	particulate matter
POHC	principal organic hazardous constituent
ppb(v)	parts per billion (volume basis)
ppm(v)	parts per million (volume basis)
QAO	quality assurance officer
QAPP	quality assurance project plan
QA/QC	quality assurance/quality control
RA	relative accuracy
RAVG	rolling average
RCRA	Resource Conservation and Recovery Act
RKI	rotary kiln incinerator
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RDL	reliable detection level
SCC	secondary combustion chamber
scfh	standard cubic feet per hour
scfm	standard cubic feet per minute
S/N	signal-to-noise ratio
SOP	standard operating procedure
SSMP	startup, shutdown and malfunction plan
SVM	semivolatile metals (cadmium and lead)
TEF	toxic equivalency factor
TEQ	toxic equivalencies
THC	total hydrocarbons
VOCs	volatile organic compounds

VOST	volatile organic sampling train
WAP	waste analysis plan
WTI	Waste Technologies Industries, Inc.

1.0 Statement of Compliance

The hazardous waste combustor (HWC) operated at the Heritage-WTI (WTI) facility in E. Liverpool, OH was tested on July 18 and 19, 2012 to assess the unit's performance relative to the confirmatory performance test (CFPT) standards and related requirements set forth in 40 CFR 63 Subpart EEE. This Report documents that WTI's rotary kiln incineration (RKI) system fully complies with these standards.

Project Approvals

Prepared By: ______________________________ Date: ______________________
Phaneendra Uppalapati
AECOM Project Manager

Approved By: ______________________________ Date: ______________________
David Moll
AECOM Technical Reviewer

2.0 Program Summary and Notification of Compliance

2.1 Summary of Test Results

WTI conducted its Maximum Achievable Control Technology (MACT) Confirmatory Performance Test (CFPT) on the RKI system during July 18 and 19, 2012.

Results from the CFPT programs demonstrated full compliance with all MACT performance standards and/or performance criteria. The test program was conducted in accordance with an approved MACT CFPT Plan and under full oversight of U.S. EPA Region 5 and the Ohio Environmental Protection Agency (OEPA). As described in the Plan, test parameters included regulated emissions and/or performance standards.

An overall summary of emission results and/or performance criteria for all MACT-regulated parameters to demonstrate compliance with CFPT is provided in **Table 2-1**.

Table 2-1 Overall Summary of CFPT Emission Results

Emissions Parameter	Results	Limit
PCDDs/PCDFs (TEQ basis)	0.018 ng/dscm	≤ 0.20 ng/dscm

Note: Emissions data corrected to 7% oxygen

2.2 Notification of Compliance (NOC)

The requirements for a NOC under the HWC MACT rule are outlined under 40 CFR 63.1210(d). As required by the regulations, an NOC is required to be submitted within 90 days of test completion. This CFPT report and NOC is being submitted within the required 90-day period which ends on **October 16, 2012**. The following sections provide the required information.

2.2.1 Facility Information

The WTI incinerator is a rotary kiln incineration system with primary and secondary combustion chambers. This is a commercial hazardous waste incineration facility that treats liquid and solid wastes that are classified as hazardous and also treats process vent streams from operations at the facility as part of the overall air emissions control program. The process is monitored and controlled by a distributed control system (DCS) capable of continuously monitoring the process to assure all operational parameters are within regulatory and permit limits while waste is being fed to the unit. In addition, this incinerator is equipped with a Continuous Emissions Monitoring System (CEMS) that continuously samples the exhaust gases for oxygen and total hydrocarbons in the stack gas exhaust stream.

The facility ID and mailing address is:

Heritage-WTI, Inc.
1250 St. George St.

East Liverpool, Ohio 43920
U.S. EPA RCRA ID # : OHD 980 613 541
Ohio Title V Permit No. 02-15-02-0233
Ohio Permit to Install No. 02-18743

The primary contact is:

Mr. Vincent Waggle
Environmental Engineer
Phone: (330)-386-2182

2.2.2 CFPT Observers

During the CFPT program, Erik M Bewley and Matt Campbell from Ohio Environmental Protection Agency Northeast District Office were present to witness the testing.

2.2.3 Source Information and Applicability

In accordance with the provisions of 40 CFR §63.1201(a), all hazardous waste combustion sources must be treated as if they are major sources under the Title V permitting program.

2.2.4 Emission Standards

The emissions standards that apply to the WTI facility that were evaluated under this program are summarized in **Table 2-2.**

Table 2-2 Applicable Emission Standards for Hazardous Waste Incinerators

Emissions Parameter	Limit	Citation
PCDDs/PCDFs (TEQ basis)	≤ 0.20 ng/dscm	40 CFR 63.1219(a)(1)(i)(A)

Note: Emission concentrations are corrected to 7% oxygen

2.2.5 Operating Parameter Limits

Operating parameter limits (OPLs) were established during the original CPT to ensure continued compliance with the MACT standards. The specific OPLs that must be set are delineated in the regulations under 40 CFR 63.1209. The approved OPLs from historic testing are provided in **Table 2-3 and 2-4** along with the test results from this CFPT demonstrating that testing was conducted under normal operating conditions. Table 2-3 summarizes those OPLs established based on previous testing along with the average test results obtained during the CFPT. Table 2-4 summarizes those OPLs based on equipment manufacturers' recommendations and/or WTI's operating experience along with the average test results obtained during the CFPT. Further discussion on the regulatory requirements associated with these OPLs and the logic pertaining to how these limits were established is provided later in Section 4.3.

Table 2-3 MACT OPLs Established Based on Emissions Testing

Process Operating Parameters	Units	Tag ID #	OPL Value	MIN or MAX	Test Run 1	Test Run 2	Test Run 3	12-mo Avg
Kiln and SCC Parameters --								
Pumpable Waste Feed Rate	lb/hr	WQI-9000T	29,926	MAX	13250	12849	12677	10359
Total Waste Feed Rate	lb/hr	WQI-9000T	35,069	MAX	22722	21709	*21522*	17427
Kiln Temperature	°F	TI-4300	1,718	MIN	1813	1825	1825	1889
SCC Temperature	°F	TI-4300	1,747	MIN	1818	1820	1828	1945
Process Gas Flowrate	wet scfm	FI-7510	67,505	MAX	62970	63880	63655	57312
Ash Feed Rate	lb/hr	WQI-9000AH	10,333	MAX	3594	3499	*3725*	3107
Chlorine Feed Rate (a)	lb/hr	WQI-9000CL	2,032	MAX	853	859	*983*	630
SVM Feed Rate (a)	lb/hr	WQI-9000SV	83.2	MAX	1.80	2.05	2.09	8.4
LVM Feed Rate (a)	lb/hr	WQI-9000LV	400	MAX	1.45	1.38	1.46	11.8
Pumpable LVM Feed Rate (a	lb/hr	WQI-9000PLV	400	MAX	0.90	0.84	0.81	2.33
Mercury Feed Rate (a)	lb/hr	WQI-9000M	0.14	MAX	0.024	0.025	0.025	0.036
FGCS Parameters --								
ESP Inlet Temperature	°F	TI-6002	424	MAX	410	410	410	400
Carbon Flow - Location 2	lb/hr	WI-7002	[redacted]	MIN	[redacted]			
Carbon Flow - Location 1	lb/hr	WI-7003		MIN				
Ring Jet Pressure Drop	in. w.c.	DPI-7401	28	MIN	29.1	29	29	33
Scrubber Liquid Flow	gpm	FQI-7201	1,287	MIN	2580	2594	2604	1908
Ring Jet Recirculation Flow	gpm	FI-7404	446	MIN	614	618	615	649
Ring Jet Blowdown	gpm	FI-7403	19.5	MIN	30.4	30.4	30.2	45
Ring Jet Sump Level	ft	LIC-7401	1.7	MIN	2	2	2	2.2
Scrubber Liquid pH	pH units	AI-7307	7.6	MIN	8.2	8.2	8.2	8.4

Table 2-4 MACT OPLs Established Based on Manufacturer' Recommendations

Process Operating Parameters	Units	Tag ID #	OPL Value	MIN or MAX?	Test Run 1	Test Run 2	Test Run 3	12-mo Avg
Kiln and SCC Parameters --								
High Btu Lance Atom. Press.	psig	06PSHL3113	30	MIN	(Z)	(Z)	(Z)	(Z)
Organic Lance Atom. Press.	psig	06PSHL3123	30	MIN	(Z)	(Z)	(Z)	(Z)
Aqueous Lance Atom. Press.	psig	06PSHL3143	30	MIN	(Z)	(Z)	(Z)	(Z)
Sludge I Lance Atom. Press.	psig	06PSHL3133	30	MIN	(Z)	(Z)	(Z)	(Z)
Sludge II Lance Atom. Press.	psig	06PSHL3100A/B	30	MIN	(Z)	(Z)	(Z)	(Z)
Slurry Lance Atom. Press.	psig	06PSHL3153	30	MIN	(Z)	(Z)	(Z)	(Z)
SCC Prressure	in. w.c.	PI-4300 A/B	(a)	MAX	-0.53	-0.53	-0.57	-0.34
FGCS Parameters --								
ESP Power Input to each Fied (b)	mA	EI-6700, EI-6710, EI-6720	100	MIN	571	573	572	551
ECIS Pressure - Location 2	psig	PI-7132	3	MIN	5	5	5	7.4
ECIS Pressure - Location 1	psig	PI-5732	3	MIN	3.9	3.9	4.1	5.4
Scrubber Pressure drop (1st & 2nd Packed Bed Combined)	in. w.c.	DPT-7207 / DPT-7307	1.3	MIN	**3.2**	**3.2**	**3.2**	**3.6**

(a) Automatic waste feed cutoffs are triggered whenever any of the following occur:
* The pressure in the SCC is greater than 0 in. w.c. for more than 10 seconds; or
* The pressure in the SCC is greater than the pressure in either shroud at any time; or
* The pressure in the SCC is greater than ambient pressure for more than 2 seconds during operating time when the pressurizing equipment for either shroud has failed.

(b) ESP Controls will be set to automatic operation; the minimum set point for secondary voltage for each field will be 45,000 volts; and the maximum set point for spark rate will be 90 sparks per minute.

(Z) These are pressure switches. If below 30 PSI will cause an AWFCO. Pressure readings are not recorded.

2.2.6 Otherwise Applicable Operating Requirements

The OPL's identified in this NOC apply at all times except during periods of startup, shutdown, or malfunction; or when hazardous waste no longer remains in the combustion chamber and the hazardous waste residence time has expired. During these periods, the facility will comply with all other applicable requirements as promulgated under sections 112 and 129 of the Clean Air Act or the specific requirements listed in the facility's Title V Permit.

2.2.7 Automatic Waste Feed Cutoff Limits

WTI's RKI system continuously operates with an automatic waste feed cutoff (AWFCO) system to ensure compliance with all applicable operating and feed rate limits. The AWFCO system triggers a waste feed cutoff whenever any of the following conditions exist:

- when an OPL is exceeded;
- when an emission standard monitored by a continuous emission monitoring system (CEMS) (i.e., total hydrocarbons) is exceeded;
- when the span value of any continuous monitoring system (CMS) detector (except a CEMS) is met or exceeded;
- upon malfunction of a CMS; and
- when any component of the AWFCO system fails (manual shutdown).

Table 2-5 lists the AWFCO limits and set points and the average test results for each test run for this CFPT. The waste feed will automatically be shut off whenever one of the set points is exceeded. Each of these operating parameters will continue to be monitored during a cutoff event. The waste feed can be restarted only after each of the above AWFCO conditions is satisfied. Every MACT parameter is tested weekly through a software simulation of each MACT exceedance to verify that the AWFCO system is operating correctly.

Table 2-5 AWFCO Parameters and Operating Limits

Process Parameters	Applicable OPL	Units	AWFCO/ MACT Limit	Test Run 1	Test Run 2	Test Run 3	12-mo Avg
Maximum Total Waste Feed Rate	*	lb/hr	35,069	22722	21709	20961	17427
Maximum Pumpable Waste Feed Rate		lb/hr	29,926	**13250**	**12849**	**12677**	**10359**
Minimumm Feed Lance Atomization Pressure	*	psig	30	(Z)	(Z)	(Z)	(Z)
Maximum SCC Pressure	*	in. w.c.	see Table 2-4	-0.53	-0.53	-0.57	-0.34
Maximum ASH Feed Rate	*	lb/hr	10,333	3594	3499	3628	3107
Maximum Total Chlorine Feed Rate	*	lb/hr	2,032	853	859	957	630
Maximum Total LVM Feed Rate		lb/hr	400	1.452	1.383	1.456	11.8
Maximum Total Pumpable LVM Feed Rate		lb/hr	400	0.9	0.843	0.814	2.33
Maximum Total SVM Feed Rate		lb/hr	83.2	1.8	2.05	2.092	8.4
Maximum Total Mercury Feed Rate		lb/hr	0.14	0.024	0.025	0.025	0.036
Maximum ESP Inlet Temperature	*	°F	424	410	410	410	400
Minimumm ESP Power Input to each Field	*	mA	100	571	573	572	551
Mimimum Kiln Temperature	*	°F	1,718	1813	1825	1825	1889
Mimimum SCC Temperature	*	°F	1,747	1818	1820	1828	1945
Maximum Process Gas Flowrate	*	wet scfm	67,505	62970	63880	63655	57312
Minimum Carbon Feed Rate - Location 1	*	lb/hr	[redacted]				
Minimum Carbon Feed Pressure - Location 1	*	psig	3.0	3.9	3.9	4.1	5.4
Minimum Carbon Feed Rate - Location 2	*	lb/hr	[redacted]				
Minimum Carbon Feed Pressure - Location 2	*	psig	3.0	5	5	5	7.4
Minimum Ring Jet Pressure Drop	*	in. w.c.	28.0	29.1	29.0	29.0	33
Minimum Scrubber (1st & 2nd Packed Bed) Liquid Flowrate	*	gpm	1,287	2580	2594	2604	1908
Minimum Scrubber (1st & 2nd Packed Bed) Combined Pressure Drop	*	in. w.c.	1.3	3.2	3.2	3.2	3.6
Minimum Scrubber (Ring Jet) Liquid Flowrate	*	gpm	446	614	618	615	649
Minimum Scrubber (Ring Jet) Blowdown	*	gpm	19.5	30	30.4	30.2	45
Minimum Scrubber (Ring Jet) Sump Level	*	ft	1.7	2.0	2.0	2.0	2.2
Minimum Scrubber (3rd Stage) Liquid pH		pH units	7.6	8.2	8.2	8.2	8.4
THC Concentration @ 7% O2	*	ppm	10	0.0	0.2	0.6	0.7

*- Denotes operating parameter limit applicable to Dioxin and Furan removal and MACT CFPT.

(Z) Lance atomization operates on pressure switches. If below 30 PSI, switch will cause an AWFCO. Pressure readings are not recorded.

2.2.8 HWC Residence Time

The HWC MACT rule defines hazardous waste residence time as *"the time elapsed from cutoff of the flow of waste into the combustor until solid, liquid and gaseous materials from the hazardous waste exit the combustion chamber."* This is a regulatory term used to define when a unit is operating under a hazardous waste combustion mode. For the purposes of establishing the residence time for WTI's rotary kiln system, this calculation is based on the time required for solid materials to pass through the kiln. This computation is a function of the diameter and length of the kiln, the angle of inclination and the kiln rotational speed. The equation for residence time is as follows:

RT = KL / [(Tan IA) x (KS) x (Pi) x (KID)]

where,

RT = residence time, minutes

KL = Kiln length = 43 ft.

IA = Inclination angle = 3 degrees = 0.05236 radians

KS = Kiln rotation speed, which varies from 0.05 to 0.5 rpm

Pi = constant = 3.14159

KID = Kiln inside diameter = 14.5 ft.

At a kiln speed of 0.05 rpm, the solid phase residence time would be 360 minutes or 6 hours. At a rotational speed of 0.5 rpm, the residence time would be 36 minutes. Using an RPM curve, a computation is preformed to provide the operator with a "counter" representing the amount of time left until the kiln is burned out and no longer is under the MACT Subpart EEE regulations. The counter is reset to 360 after every bulk or drum feed. When the counter counts down from 360 to 0 and there are no lances established, the waste retention flag is no longer set.

2.2.9 Fugitive Emissions

WTI complies with the requirements of 40 CFR 63.1206(c)(5)(i)(B) for controlling combustion system leaks of hazardous air pollutants (HAPs) by maintaining the maximum combustion zone pressure lower than ambient pressure using an instantaneous monitor.

[redacted]

Under normal operating condition, the induced draft fan maintains the pressure in the combustion chamber below ambient conditions. During pressure spikes, the shrouds act as an alternative means of controlling combustion system leaks. This is equivalent to maintaining the pressure in the combustion zone below ambient pressure. The process controller samples the pressure every 0.5 seconds and one-minute data averages are recorded.

2.2.10 Other MACT Operating Requirements

2.2.10.1 Startup, Shutdown Malfunction Plan

WTI has previously developed and placed in the operating record a Startup, Shutdown and Malfunction Plan (SSMP) in accordance with 63.6(e)(3) and 63.1206(c)(2)(ii)(B). The SSMP describes, in detail, procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction; and a program of corrective action for malfunctioning process and monitoring equipment used to comply with the relevant standard.

2.2.10.2 Operation and Maintenance Plan

WTI has previously developed and placed in the operating record an Operation and Maintenance Plan (O&M Plan) in accordance with 63.1206(c)(7). The O&M Plan describes in detail procedures for operation, inspection, maintenance, and corrective measures for all components of the combustion system that could affect emissions of regulated hazardous air pollutants. The plan prescribes how the facility operates and maintains the combustor in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels achieved during the CPT. This plan ensures compliance with the operation and maintenance requirements of 63.6(e) and minimizes emissions of pollutants, automatic waste feed cutoffs, and malfunctions.

2.2.10.3 CMS QC Program Plan

WTI has previously prepared and currently operates under a CMS QC Program Plan as required by 40 CFR 63.8(c)(3), 63.8(d) and the Appendix to Subpart EEE. This document provides detailed instrument specifications and audit and calibration procedures for all of the continuous monitoring instrumentation (including the continuous emission monitors) associated with the RKI system.

2.2.10.4 Feed Stream Analysis Plan

WTI has previously updated and revised the RCRA waste analysis plan (WAP) such that it now incorporates all required elements of a MACT Feed Stream Analysis Plan (FSAP). The FSAP specifies the following information relative to WTI's hazardous waste streams:

- Parameters to be analyzed;
- How the data are obtained (i.e., direct sampling and analysis or from other sources);
- How the data will be used to document compliance with applicable feed rate limits;
- Test methods used;
- Sampling methods used to ensure collection of representative samples; and
- Frequency of analyses.

2.2.10.5 Operator Training and Certification

WTI has previously developed and implemented an Operator Training and Certification (OTC) Program as required by 40 CFR 63.1206(c)(6). The OTC program is designed to provide training to all personnel whose activities may reasonably be expected to directly affect emissions of hazardous air pollutants from the incineration system. Control room operators are trained and certified in accordance with 40 CFR 63.1206(c)(6)(iii). At least one certified control room operator is on duty at the site at all times while the unit is in operation.

2.2.11 Certification

Heritage-WTI hereby certifies that:

(i) All required CEMS and CMS are installed, calibrated and continuously operating in compliance with the requirements of Subpart EEE;

(ii) Based on the results of previous comprehensive performance testing and the confirmatory performance test program conducted on July 18 and 19, 2012, the rotary kiln incineration system is operating in compliance with the emission standards and operating requirements of 40 CFR Part 63 Subpart EEE; and

(iii) The OPLs required by 40 CFR 63.1209 and specified in this NOC ensure compliance with the emission standards.

Signature:
Name: Mr. John Avdellas
Title: Vice President
Date:

3.0 Introduction and Process Description

3.1 Introduction and Project Background

The WTI facility is subject to the HWC MACT rule promulgated by the U.S. EPA on September 30, 1999 in 40 CFR 63 Subpart EEE. Initial comprehensive performance testing to document compliance with the interim standards was performed in September and December 2003, March and April 2004 and March, April, May and September 2010.

In preparation for this test program, WTI submitted a CFPT plan in May 2012 to OEPA and EPA Region 5. The CFPT was conducted in accordance with the approved plan on July 18 and 19, 2012.

3.2 Facility Overview

The WTI incinerator is a rotary kiln incineration system with primary and secondary combustion chambers that treats solid wastes as well as aqueous and organic liquids. The process is monitored and controlled by a DCS capable of continuously monitoring the process to assure all operational parameters are within regulatory and permit limits while waste is being fed to the unit. In addition, this incinerator is equipped with a CEMS that continuously samples the exhaust gases for oxygen and total hydrocarbons in the stack gas exhaust stream. In addition, a comprehensive air pollution control system is operated to comply with all emission standards.

3.3 Process Description

This section presents a summary description of the WTI incinerator train. Detailed process and instrumentation diagrams (P&IDs) for individual system components as well as the overall treatment train were provided in Appendix B of the approved CFPT Plan. Brief descriptions for each major section of the overall combustion system are provided below. Further details can be found in the aforementioned CFPT Plan.

3.3.1 Overall Waste Treatment System

3.3.1.1 Primary Combustion Chamber (PCC)

The PCC is capable of incinerating containerized, bulk, and pumpable waste in solid, liquid, gaseous and sludge form. The rotary kiln is 16 ft (5.0 m) in diameter, and is 43 ft (13.1 m) in length. The kiln is constructed of carbon steel with a refractory inner lining. Seals located at each end of the kiln are designed to minimize leakage of air into the kiln. Fugitive emissions from the kiln are prevented through two mechanisms. First, negative pressure is maintained in the kiln by the I.D. fan and the pressure is measured at the discharge end of the kiln. [redacted]

3.3.1.2 Secondary Combustion Chamber (SCC)

The SCC provides for continued burning and retention time. Solid particles passing to the SCC and residue from the kiln drop into a water filled quench tank below the SCC. The SCC achieves complete burnout of incinerator off-gases by maintaining an elevated temperature for sufficient time and by ensuring turbulent mixing through introduction of steam, secondary combustion air and/or oxygen. The SCC is refractory lined, and has an insulated outer shell to minimize heat losses. Flue gas from the SCC flows into the heat recovery boiler. The dimensions of the SCC are 18'2"' wide x 18'7" long x 56'6" high.

3.3.1.3 Oxygen Injection

[redacted]

3.3.1.4 Waste Heat Recovery Boiler

The waste heat recovery boiler (HRB) utilizes heat generated from waste incineration to produce steam for plant use. Flue gas temperatures entering the boiler are approximately 1380°F; flue gas leaving the boiler is approximately 700°F. Particulate accumulation on tube surfaces is removed by mechanical rapping, which occurs every 30 minutes during normal operation condition. Gases from the boiler section pass on to the evaporative quench section (spray dryer).

3.3.1.5 Evaporative Quench (Spray Dryer)

The Spray Dryer performs two functions; (1) the cooling of the flue gas; and (2) the evaporation of effluent or blowdown from the four stage wet scrubber. The spray dryer is constructed of carbon steel and is heated and insulated to prevent corrosion. The cylindrical-shaped unit is approximately 36 feet in diameter and 104.5 feet tall. At the base of the unit is a cone-shaped hopper that collects salts and fly ash. The inlet temperature of the flue gas is approximately 700 to 750°F; the temperature at the outlet is approximately 400°F.

3.3.2 Waste Feed Systems

3.3.2.1 Liquid Waste Feeds

The front wall of the kiln is equipped with six (6) steam or air-atomized pumpable waste lances referred to as the organic lance, the high Btu lance the aqueous lance, the slurry lance, the sludge lance, and the secondary sludge lance. The sources of the waste for these lances can vary depending on the operation plan for any specific day. Typically, one or two of those lances are being used for material being directly fed from a tanker, and one of those lances is being used for material being fed directly from a drum. The lances that are assigned to these streams will vary. The remaining lances are being fed from the liquid waste tank farm or the pump-out tanks.

3.3.2.2 Solid Waste Feeds

Solid wastes are fed into the incinerator through a common feed chute from three different sources: containerized material, the skip hoist, and the bulk solid pits. The containerized feed system can feed any container that will physically fit through the feed chamber. Currently, 55 gallon drums (paper and metal), 85 gallon over packs, boxes of various sizes, 5 gallon buckets, and various cans are fed via this system. There are no individual weight restrictions, however there is a total solid feed limit which encompasses all solid feed mechanisms and does not restrict feeds from any one mechanism. The solids feed to the kiln may be a combination of the three mechanisms or entirely from one of the feed mechanisms as long as the feed limit is maintained.

3.3.2.3 Process Vent Streams

The process vent system is supplied by the waste storage and waste processing areas throughout the facility. The waste storage areas include the organic tank farm, the pump-out tanks, the drum warehouse, and the bulk solids pits. The process areas include the external truck wash, the drum sampling area, the drum splitting area, the drum pump-out area, the drum extruder, the two direct tanker feed bays, and the direct drum feed system. [redacted]

3.3.2.4 Supplemental Fuels

Fuel oil and natural gas are two supplemental fuels that are used in the incineration process. There are gas burners present in the front wall of the rotary kiln which are used during heat up and cool down periods and when incineration conditions require additional fuel. The fuel oil is fed to the organic lance from a dedicated fuel tank in the Tank Farm. This material is used during heat-up and cool-down periods and to maintain temperature while waste is not being fed to the kiln. There are also gas burners present in the secondary combustion chamber but the gas lines have blind flanges installed and therefore the burners are not functional.

3.3.3 Air Pollution Control Equipment

The flue gas cleaning system (FGCS) consists of an oxides of nitrogen (NO_x) control system and an electrostatic precipitator (ESP) followed by a quench and multistage wet scrubber. The system is also equipped with a **proprietary** activated carbon injection system for controlling PCDD/PCDF and mercury emissions. The overall FGCS also includes an induced draft fan, a plume suppression system and exhaust stack.

3.4 Process Monitoring

The plant DCS is a [redacted] system. Process and motor control are performed in the DCS. The operator control console is located in the control room and consists of three operator stations, each with two screens.

The natural gas burners are supervised by microprocessor based flame safety systems. Burner status and control are provided for in the DCS. The auxiliary fuel supply set point, which indicates a failure, is the natural gas supply side pressure.

3.4.1 Continuous Monitoring Systems

A variety of process parameters are monitored to ensure ongoing compliance with applicable MACT standards. Continuous monitors are used to track all of the operating parameters summarized previously in Table 2-3.

3.4.2 Continuous Emissions Monitoring System

An extensive array of instrumentation is used to monitor the stack gas stream on a continuous basis. A brief description of the CEMS instruments including the operating range and measurement principal is provided in **Table 3-1**.

Table 3-1 Continuous Emission Monitoring Instrumentation

Location	Instrument Type	Meas. Basis	Range	Mfg.	Model No.	Serial No.
Process Flow	Flow	Wet-scfm	0-80,000	USI	Ultraflow 100	9401820
	Calc. Flow	Wet-scfm	N/A	N/A	N/A	N/A
Reheat Flow	Flow	Wet-scfm	0-50,000	USI	Ultraflow 100	Q-08572U-0793
Stack Outlet	THC #1 (certified at 2 ranges)	Wet	0-100 ppm 0-500 ppm	CAI	600HFID	U12054
	THC #2 (certified at 2 ranges)	Wet	0-100 ppm 0-500 ppm	CAI	600HFID	U12055
	O_2	Dry	0-25 %	Ametec	2000	C127340-1
	O_2	Dry	0-25 %	Ametec	2000	10206379
	O_2	Wet	0-25 %	Ametec	2000	C101180-102
	O_2	Wet	0-25 %	Ametec	2000	10206503
	CO	Dry	0-750 ppm	Thermo Scientific	48i	CM10360078
	Stack Flow	Wet-scfm	0-100,000	Teledyne	Ultraflow 150	1501036
	Stack Flow (Calculated)	Wet-scfm	N/A	N/A	N/A	N/A
Scrubber Outlet	Flow	Wet-scfm	0-80,000	USI	Ultraflow 100	9407820
	Calc. Flow	Wet-scfm	N/A	N/A	N/A	N/A

4.0 Process Operating Conditions

4.1 Overview of Planned Test Conditions

This CFPT was designed to demonstrate performance for the WTI RKI system through implementation of a comprehensive emission measurement program using actual feed materials. The CFPT was conducted under one (1) process operating test condition to enable demonstration of all required emission levels and process monitoring requirements. The test condition planned included a normal operating condition, this condition is within the range of the average level from the minimum level to the maximum allowed. The details of the test condition and the materials that were planned to be fed are discussed in the following sections.

4.1.1 Operating Conditions

The CFPT was conducted during normal operating test conditions for the following parameters presented in **Table 4-1.** The table presents the parameter average, minimum and maximum values which were used as the range of operation for these parameters during the test. Table 4-1 displays the average, minimum, maximum and std. dev. of WTI's operating parameters over the past 12 months. The average values were determined by the sum of the hourly rolling average values recorded (each minute) over the previous 12 months, divided by the number of rolling averages recorded during that time. This data was constructed from system operating records logged when the unit was conducted waste operations. This data was used as a guideline for operations during the CFPT.

4.2 Facility Monitoring Data

Throughout this confirmatory test program, the facility's process control computers and DAS collected detailed process information continuously. **Tables 2-3, 2-4, and 2-5 previously** provided summaries of process data for the normal operating condition, including average values and 12-month rolling averages for key process variables recorded during all sampling run periods. Detailed one-minute process data summaries for all tests are included in **Appendix A**.

Table 4-1 Process Operating Data Summary for Normal Operating Condition

Process Parameter	Tag ID	Units	MACT OPL	Average[1]	Minimum	Maximum	St. Dev.
Maximum Total Waste Feed Rate	WQI-9000F	lb/hr	35,069	17,427	548	33,313	3,727
Maximum Pumpable Waste Feed Rate	WQI-9000T	lb/hr	29,926	10,359	499	20,945	2,818
Maximum Ash Feed Rate	WQI-9000AH	lb/hr	10,333	3,107	439	6,183	938
Maximum Total Chlorine Feed Rate	WQI-9000CL	lb/hr	2,032	630	49	1,663	265
Maximum Total LVM Feed Rate	WQI-9000LV	lb/hr	400	11.8	0.2	155.9	17.3

Process Parameter	Tag ID	Units	MACT OPL	Average[1]	Minimum	Maximum	St. Dev.
Maximum Total Pumpable LVM Feed Rate	WQI-9000PLV	lb/hr	400	11.8	0.2	155.9	17.3
Maximum Total SVM Feed Rate	WQI-9000SV	lb/hr	83.2	8.4	0.2	49.2	7.0
Maximum Total Mercury Feed Rate	WQI-9000M	lb/hr	0.14	0.036	0.003	0.133	0.026
Maximum ESP Inlet Temperature	TI-6002	°F	424	400	352	426	3
Maximum ESP Power Input to each Field	EI-6700, 6710, 6720	mA	100	453	105	495	55
Maximum Kiln Temperature	TI-4300	°F	1,718	1,889	1,760	2,140	57
Minimum SCC Temperature	TI-4310	°F	1,747	1,945	1,758	2,165	60
Maximum Process Gas Flowrate	FI-7510	wet scfm	67,505	57,318	45,764	64,997	2,215
Minimum Carbon Feed Rate – Location 1	WI-7003	lb/hr	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Minimum Carbon Feed Pressure – Location 1	PI-5732	psig	3	5.4	3.2	7.3	0.9
Minimum Carbon Feed Rate – Location 2	WI-7002	lb/hr	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Minimum Carbon Feed Pressure – Location 2	PI-7132	psig	3	7.4	3.3	10.6	1.5
Minimum Ring Jet Pressure Drop	DPI-7401	in. w.c.	28	33	28	40	2
Minimum Scrubber (1st & 2nd Packed Bed) Liquid Flowrate	FQI-7201	gpm	1,287	1,908	1,338	2,636	242
Minimum Scrubber (1st & 2nd Packed Bed) Combined Pressure Drop	DPT-7207, 7307	in. w.c.	1.3	3.6	1.5	11.7	1.6
Minimum Scrubber (Ring Jet) Liquid Flowrate	FI-7404	gpm	446	649	491	1,025	65
Minimum Scrubber (Ring Jet) Blowdown	FI-7403	gpm	19.5	45	19	100	11
Minimum Scrubber (Ring Jet) Sump Level	LIC-7401	ft	1.7	2.2	1.7	3.0	0.1
Minimum Scrubber (3rd Stage) Liquid pH	AI-7307	pH units	7.6	8.4	7.6	10.2	0.3

Process Parameter	Tag ID	Units	MACT OPL	Average[1]	Minimum	Maximum	St. Dev.
THC[2] Concentration @ 7% O2	AI-7851	ppm	10	0.7	0.0	18.4	1.4

[1] The average values were determined by the sum of the hourly rolling average values recorded (each minute) over the previous 12 months, divided by the number of rolling averages recorded during that time. This data was constructed from system operating records logged when the unit was conducting waste operations.

[2] Though the average THC value for the 12-month period is 0.7 ppm, it would be difficult for WTI to maintain a THC concentration between this average value and the allowable limit for the CfPT. THC is the result of poor combustion. WTI attempts to achieve proper combustion at all times with a goal of zero THC emissions. WTI operated in such a manner during the CFPT which resulted in THC concentrations less than 0.7 ppm. To account for this, WTI has submitted an alternative operating range in accordance 40 C.F.R. 63.1207(g)(2)(v) and was approved by EPA.

4.3 Permit Limits and Operating Parameter Limits

On the basis of a successful CPT, WTI has determined operating limits for the RKI system as delineated in **Tables 4-2 through 4-4**. Table 4-2 provides a listing of those OPLs associated with the kiln and SCC. Table 4-3 summarizes the OPLs established for the flue gas cleaning system. Finally, Table 4-4 lists the OPLs that have been established based upon manufacturer recommendations and/or WTI's historical operating experience. These OPLs have been programmed into the DAS to ensure continuous ongoing compliance with the MACT standards.

Table 4-2 Operating Parameter Limits Established for the Kiln and SCC

Process Parameter	Units	MACT OPL
Maximum Total Hazardous Waste Feed Rate	lb/hr	35,069
Maximum Total Pumpable Hazardous Waste Feed Rate	lb/hr	29,926
Minimum Kiln Temperature	°F	1,718
Minimum SCC Temperature	°F	1,747
Maximum Process Gas Flow Rate	wet scfm	67,505
Maximum Ash Feed Rate	lb/hr	10,333
Maximum Total Chlorine Feed Rate	lb/hr	2,032
Maximum Total Mercury Feed Rate	lb/hr	0.140
Maximum Total LVM (As, Be & Cr) Feed Rate	lb/hr	400
Maximum Total Pumpable LVM (As, Be & Cr) Feed Rate	lb/hr	400
Maximum Total SVM (Cd & Pb) Feed Rate	lb/hr	83.2

Table 4-3 Operating Parameter Limits Established for the Flue Gas Cleaning System

Process Parameter	Units	MACT OPL
Maximum ESP Inlet Temperature	°F	424
Minimum Carbon Feed Rate – Location 1 (Confidential)	lb/hr	[redacted]
Minimum Carbon Feed Rate – Location 2 (Confidential)	lb/hr	[redacted]
Maximum Ring Jet Pressure Drop	in. w.c.	28.0
Minimum Scrubber (1st & 2nd Packed Bed) Liquid Flow	gpm	1,287
Minimum Scrubber (Ring Jet) Liquid Flow	gpm	446
Minimum Scrubber (Ring Jet) Blowdown Rate	gpm	19.5
Minimum Scrubber (Ring Jet) Tank Level	feet	1.7
Minimum Scrubber (3rd Stage) Liquid pH	pH units	7.6
THC Concentration @ 7% O_2	ppm	10

Table 4-4 Operating Parameter Limits Established Based on Manufacturer's Recommendations

Process Parameter	Units	MACT OPL
Minimum Feed Lance Atomization Pressure (each of 6 lances)	psig	30
Maximum SCC Pressure	in. w.c.	**(a)**
Minimum Carbon Feed Pressure – Location 1	psig	3.0
Minimum Carbon Feed Pressure – Location 2	psig	3.0
Minimum Power Input to each ESP field	ma	100
Minimum Scrubber (1st and 2nd Packed Bed) Pressure Drop	in. w.c.	1.3

(a) See Table 2-4 for details on this parameter.

The permit limits for each of the control parameters have been established as specified in the HWC MACT regulations given in 40 CFR 63.1209. The following sections provide further details on the regulatory requirements associated with each OPL and the logic pertaining to how the limit has been established to ensure compliance with the applicable MACT standards.

4.3.1 Parameters Demonstrated by Testing During the CPT

4.3.1.1 Minimum Kiln and SCC Temperature [40 CFR 63.1209(j(1), (k)(2)]

The minimum combustion chamber operating limit is established for maintaining compliance with the PCDD/PCDF emission standards. For WTI's system, limits are established for both the PCC (kiln) and the SCC. Combustion chamber temperature is monitored on a continuous basis and the minimum temperature limit for each combustion zone is established as an hourly rolling average (HRA) equal to the average of the test run average values. CPT testing was used to establish these limits.

4.3.1.2 Maximum Total and Pumpable Hazardous Waste Feed Rate [40 CFR 63.1209(j(3), (k)(4)]

The maximum total and pumpable hazardous waste feed rate operating limit is established for maintaining compliance with the PCDD/PCDF emission standards. The limits are established as an HRA limit from the average of the maximum HRAs demonstrated during the CPT. CPT testing was used to establish these limits.

4.3.1.3 Maximum Process Gas Flowrate [40 CFR 63.1209(j(2), (k)(3), (m)(2), (n)(5), (o)(2)]

The maximum process gas flowrate operating limit is established for maintaining compliance with the PCDD/PCDF emission standards. The maximum process gas flowrate has been established as the average value from the three test runs. Maximum process gas flow rate is established as an appropriate surrogate for gas residence time in the combustion chamber and is monitored on an HRA basis. The maximum process gas flowrate is established as the average of the maximum HRAs observed during the CPT.

4.3.1.4 Maximum ESP Inlet Temperature [40 CFR 63.1209(k)(1), (n)(1)]

The maximum ESP inlet temperature operating limit is established for maintaining compliance with the PCDD/PCDF emission standards. The maximum ESP inlet temperature has been established as the average value from the three test runs. The maximum ESP inlet temperature is monitored on an HRA basis and is established as the average of the test run averages observed during the CPT.

4.3.1.5 Minimum Carbon Feed Rate [40 CFR 63.1209(k)(6)(i)]

The minimum carbon injection rate operating limit is established for maintaining compliance with the PCDD/PCDF emission standards. The minimum carbon feed rate for the two locations where activated carbon is injected has been established CPT where both dioxin and furan emissions complied with the standards. Carbon feed rate is monitored on a continuous basis and the minimum feed rate limit for each injection location is established as an hourly rolling average (HRA) equal to the average of the test run average values.

4.3.1.6 Minimum Ring Jet Recirculation Flowrate [40 CFR 63.1209(m)(1)(C)]

The minimum ring jet recirculation flowrate is established for maintaining compliance with the PCDDs/PCDFs emission standards. The minimum ring jet recirculation flowrate has been established as the average value from the three test runs. The minimum ring jet recirculation flowrate is monitored on an HRA basis and is established as the average of the test run averages observed during the CPT.

4.3.1.7 Minimum Ring Jet Blowdown Rate [40 CFR 63.1209(m)(1)(B)]

The minimum ring jet blowdown rate is established for maintaining compliance with the PCDDs/PCDFs emission standards. The minimum ring jet blowdown rate has been established as the average value from the three test runs. The minimum ring jet blowdown rate is monitored on an HRA basis and is established as the average of the test run averages observed during the CPT.

4.3.1.8 Minimum Ring Jet Sump Level [40 CFR 63.1209(m)(1)(B)]

The minimum ring jet sump level is established for maintaining compliance with the PCDDs/PCDFs, emission standards. The minimum ring jet sump level has been established as the average value from the two three test runs. The minimum ring jet sump level is monitored on an HRA basis and is established as the average of the test run averages observed during the CPT.

4.3.2 Parameters Established by Manufacturer's Recommendations and/or Good Operating Practice

4.3.2.1 Operation of Waste Firing System [40 CFR 63.1209(j)(4)]

This regulation stipulates that facilities should specify operating limits to ensure that good operation of the firing system is maintained to ensure compliance with the DRE standard. To satisfy this requirement, WTI has established a minimum waste feed atomization pressure for each of the six (6) liquid feed lances. The minimum atomization pressure limit is established based on manufacturer's recommendations and WTI's operating experience.

4.3.2.2 Fugitive Emissions Control / SCC Pressure [40 CFR 63.1206(c)(5)(i)(B) and 63.1209(p)]

[redacted]

4.3.2.3 Minimum Carrier Fluid Pressure for the Activated Carbon Injection System [40 CFR 63.1209(k)(6)(ii)]

A minimum carbon injection pressure at both injection locations has been established based on manufacturer specifications.

4.3.2.4 Minimum Scrubber Pressure Drop [40 CFR 63.1209(o)(3)(ii)]

Based on manufacturer recommendations, a minimum scrubber pressure drop has been established for the (combined) 1st and 2nd packed bed sections of the scrubber.

5.0 Feed Stream Sampling and Analysis

5.1 Waste Stream Sampling

Each waste feed material fed during the test was sampled from taps in the feed lines or other appropriate locations, upstream of any principal organic hazardous constituent (POHC) or metal spiking location. The waste feed streams were sampled in accordance with the procedures and methodologies currently described in the facility's FSAP.

The feed streams were characterized for ash, density (liquids), heat content, metals and total chlorine. WTI personnel were responsible for all waste feed sampling and subsequent analyses.

For solid waste feed streams, a sample from each container fed to the kiln will be collected and analyzed separately. For bulk solids feeds, each container that is placed into the bulk solids pits will be collected from the front, middle, and back of each container and combined prior to analysis. The results represent the material that was being fed to the incinerator during the CFPT from the bulk solid pits. This is the same procedure currently used during normal operation.

5.2 Waste Stream Analytical Results

All waste feeds charged to the RKI system during the MACT CFPT were analyzed in accordance with Heritage-WTI's FSAP pursuant to MACT regulations and Section C (Waste Analysis Plan) of the facility's RCRA permit. Analysis and QA/QC procedures followed the approved test methods contained in these documents. Waste analysis included samples taken from all solid and liquid feeds used during the test. Solid feeds, in the form of containerized materials, were sampled prior to testing and analyzed in Heritage-WTI's onsite laboratory. Liquid feeds from storage tanks and tanker trucks were sampled during the CFPT events at regular intervals. Composites of these samples were also analyzed in the onsite laboratory. Parameters for which the waste was tested are displayed in Table 5-1.

Appendix C provides a full summary of the analytical results associated with all waste feed streams as determined by WTI's onsite laboratory.

Table 5-1 WTI Laboratory Test Methods for Waste Feed (Relative to the CFPT)

Parameter	Method Description	Analytical Methods
Ash Content	Ash from Petroleum Products	EPA M 9040
Inorganic Anions	Anions in Water by Ion Chromatography (Fluorine, Chlorine, Bromine, Sulfur, Iodine)	EPA M 300 and ASTM D 4327
Heat Content	Bomb Combustion Method for Solid Waste	EPA M 5050 and ASTM D 12964

Inorganic Preparation Methods	Acid Digestion of Sediments, Sludges & Soils (Metals)	EPA M 3050
	Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy	EPA M 3005
	Microwave Assisted Acid Digestion of Aqueous Samples and Extracts (Metals)	EPA M 3015
	Microwave Assisted Acid Digestion of Sediments Sludges, Soils & Oils (Metals)	EPA M 3051
	Toxicity Characteristic Leaching Procedure (TCLP - Metals)	EPA M 1311
Paint Filter	Paint Filter Liquids Test	EPA M 9095A
Inorganic Analysis Procedures	Inductively Couples Plasma-Atomic Emission (Metals) Spectroscopy	EPA M 6010
	Mercury in Liquid Waste (Manual Cold-Vapor Technique)	EPA M 7470
	Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)	EPA M 7471
pH	pH Electrometric Measurement	EPA M 9040
	Soil & Waste pH	EPA M 9045
Physical Description	Physical Description Screening Analysis in Waste	ASTM D 4979
Radioactivity Screen	Radioactivity	WTI Method W-1002
Specific Gravity	Specific Gravity Apparent of Liquid Industrial Chemicals	ASTM D 891
Viscosity	Low Temperature Viscosity Measured by Brookfield Viscometer	ASTM D 2983-87
Water Content	Water in Crude Oils (Karl Fischer) Titration	ASTM D 4377
	Water in Paints & Paint Materials by Karl Fischer Method	ASTM D 4017

6.0 Performance Test Results

This section presents a detailed summary of the emission test results obtained during CFPT sampling conducted in accordance with the procedures outlined in 40 CFR 63.1208. The sections below provides summaries of the test results for each measured parameter

6.1 PCDDs/PCDFs

EPA Method 0023A was used to sample for all target PCDD / PCDF congeners during the test condition. The sampling runs involved isokinetic sampling at 12 points (6 points per traverse) with an overall net run length of 180 minutes. Sampling was conducted for 15 minutes per point with meter box readings taken every 7.5 minutes. The sampling train consisted of 5 glass impingers connected in series with leak-free ground glass and Teflon o-ring connections. The first impinger was left empty and the second and third impingers were filled with 100-mL of HPLC water. The fourth impinger was also left empty and the fifth impinger was loaded with ~ 200-400 g of silica gel. The sampling train used an untared glass fiber filter, an XAD resin trap and condensing module and was operated as specified in the method. The recovered sample train fractions (front-half rinse, particulate filter, XAD resin module and back-half rinse) were submitted to **Vista Analytical (El Dorado Hills, California)** for all laboratory analyses. The analytical data summary is provided in **Appendix E** of this test report. The full analytical data package is provided on the CD electronic version.

Test results for the program are summarized in **Table 6-1**. Emission results demonstrate full compliance with the MACT standard (0.20 ng/dscm TEQs corrected to 7% O_2). It should be noted that when demonstrating compliance with an emission standard, any non-detects can be reported as zero (as allowed under 63.1208(b)(1)(iii)).

Table 6-1 PCDD/PCDF Emission Results

	Run No.		C1-R1		C1-R2		C1-R3	
	Date		18-Jul-12		19-Jul-12		19-Jul-12	
	Start Time		11:20		09:10		13:03	
	Stop Time		17:50		12:20		16:08	
	Units							
Sample Volume	dscf		122.049		120.059		120.721	
Sample Volume	m^3		3.46		3.40		3.42	
Moisture Content	% v/v		31.4		30.5		30.4	
O_2 Concentration	% v/v (dry)		13.80		13.77		13.80	
CO_2 Concentration	% v/v (dry)		5.40		5.43		6.00	
Isokinetics	%		104		101		101	
Stack Flowrate	dscfm		50,640		51,430		51,583	
PCDD / PCDF Parameters	TEF (a)	pg	ng/m^3 TEQ	pg	ng/m^3 TEQ	pg	ng/m^3 TEQ	
2,3,7,8-TCDD	1.00	(2.59)	0.0E+00	2.26	6.6E-04	(2.18)	0.0E+00	
1,2,3,7,8-PeCDD	0.50	6.05	8.8E-04	3.95	5.8E-04	7.85	1.1E-03	
1,2,3,4,7,8-HxCDD	0.10	(4.23)	0.0E+00	(3.36)	0.0E+00	2.99	8.7E-05	
1,2,3,6,7,8-HxCDD	0.10	4.94	1.4E-04	5.72	1.7E-04	8.87	2.6E-04	
1,2,3,7,8,9-HxCDD	0.10	(2.67)	0.0E+00	(2.17)	0.0E+00	2.41	7.0E-05	
1,2,3,4,6,7,8-HpCDD	0.01	17.88	5.2E-05	5.90	1.7E-05	19.09	5.6E-05	
OCDD	0.001	20.40	5.9E-06	27.90	8.2E-06	31.30	9.2E-06	
2,3,7,8-TCDF	0.10	14.27	4.1E-04	13.40	3.9E-04	16.60	4.9E-04	
1,2,3,7,8-PeCDF	0.05	24.20	3.5E-04	26.41	3.9E-04	37.58	5.5E-04	
2,3,4,7,8-PeCDF	0.50	26.00	3.8E-03	22.23	3.3E-03	38.60	5.6E-03	
1,2,3,4,7,8-HxCDF	0.10	8.21	2.4E-04	22.77	6.7E-04	47.68	1.4E-03	
1,2,3,6,7,8-HxCDF	0.10	33.60	9.7E-04	27.94	8.2E-04	48.45	1.4E-03	
2,3,4,6,7,8-HxCDF	0.10	16.20	4.7E-04	12.30	3.6E-04	22.51	6.6E-04	
1,2,3,7,8,9-HxCDF	0.10	(2.19)	0.0E+00	(2.28)	0.0E+00	2.91	8.5E-05	
1,2,3,4,6,7,8-HpCDF	0.01	99.00	2.9E-04	55.20	1.6E-04	121.50	3.6E-04	
1,2,3,4,7,8,9-HpCDF	0.01	4.75	1.4E-05	(3.35)	0.0E+00	(3.41)	0.0E+00	
OCDF	0.001	9.16	2.7E-06	5.28	1.6E-06	8.15	2.4E-06	
TOTAL TEQs (ng/m^3)		=	0.008		0.008		0.012	**Avg**
TOTAL TEQs (ng/m^3 @ 7 % O_2)		=	**0.015**		**0.015**		**0.024**	**0.018**
TOTAL TEQs (g/s)		=	1.8E-10		1.8E-10		3.0E-10	

(a) U.S.EPA (1989) Toxic Equivalency Factor

Note: "Non-detect" values are shown in parentheses and treated as zero in the calculation of concentration on a TEQ basis.

7.0 Quality Assurance/Quality Control Documentation

This test program incorporated a variety of QA/QC measures to ensure the validity of the final results for documentation of the performance of WTI's hazardous waste rotary kiln incineration system. These measures were based upon routine field and laboratory practices as well as specific requirements delineated in the approved MACT CFPT Plan date May 2012 and the applicable sampling and analytical protocols.

This section presents the results of all QA/QC measures evaluated during field sampling program and during sample analysis. Data generated for the program are judged to be completely valid since overall accuracy and precision goals consistent with general program objectives were achieved. Analytical QA/QC data are presented to support all sample results used for determining compliance with performance criteria and/or emission standards.

7.1 Sample Collection QA/QC

7.1.1 Waste Feed Streams

Each waste feed material fed during each testing phase was sampled from taps in the feed lines or other appropriate locations, upstream of any POHC or metal spiking location. The waste feed streams were sampled in accordance with the procedures and methodologies currently described in WTI's FSAP. The waste feed materials were fully characterized and the analytical results have been incorporated into **Appendix C** of this final report.

For solid waste feed streams, a sample from each container fed to the kiln will be collected and analyzed separately. For bulk solids feeds, each container that is placed into the bulk solids pits will be collected from the front, middle, and back of each container and combined prior to analysis. The results represent the material that was being fed to the incinerator during the CFPT from the bulk solid pits. This is the same procedure currently used during normal operation.

No problems were encountered during the collection of the various waste feed streams.

7.1.2 Stack Gas

All samples were collected at one or more of the available sampling platforms on the RKI exhaust stack as planned. One (1) field blank of each isokinetic sampling train was also submitted for analysis during each individual sampling event. Sampling QA/QC measures for this program included the calibration of all applicable sampling equipment used as described below. Field equipment were calibrated according to EPA procedures specified in EPA/600/R-94/038e (September 1994) and 40 CFR 60, Methods 1-5, as well as manufacturer's specifications.

1) **Dry Gas Meters and Orifice Meters (EPA Method 5 Type)** -- Dry gas meters for all sampling trains are calibrated using critical orifices. The procedure entails four runs using four separate critical orifices running at an actual vacuum 1-2 in. greater than the theoretical critical vacuum. The minimum sample volume required per orifice is 5 ft^3. Meter boxes are calibrated annually and then verified by use of the alternative Method 5 post-test calibration procedure. This procedure is referenced as Approved Alternate Method ALT-009 (June 21, 1994) by EPA's Emission Measurement Center. The

average Y-value obtained by this method must be within 5% of the initial Y-value. The calculations provided with the data sheets in **Appendix D** show that this criterion was met for all of the isokinetic sampling trains used on all three test programs. These results are summarized in the three tables below. All annual calibration forms for all meter boxes are also provided in **Appendix D**.

Isokinetic Meter Box Calculations for the Test Program

Isokinetic Meter Box	Test Parameter	Total Number of Runs	Average Deviation from. Pre-Y (a)
80645	Method 0023A	3	2.7%

(a) Tolerance: ± 5% of initial Y value

2) Sampling Nozzles -- Each glass nozzle is calibrated with a micrometer prior to testing and identified with a unique ID number. These data are then checked onsite prior to use. Any stainless steel nozzles used during the program are calibrated onsite prior to testing. The internal diameter of each nozzle used is measured to 0.001 inches along three points of the circumference with a dial vernier caliper and the three measurements are then averaged. Nozzle calibration data are provided in **Appendix D**.

3) Balance -- The analytical balance used in the field to determine initial and final silica gel weights is calibrated against Class M weights provided by the Mettler Corporation.

4) Thermocouples -- The Type K thermocouples in each meter control box, heated sample box, impinger umbilical connector, XAD resin trap and sample probe are calibrated against ASTM mercury-in-glass thermometers at two or more points: an ice bath, ambient temperature and/or boiling water bath. Calibration data are provided in **Appendix D**.

5) Pitot Tubes -- Each S-type stainless steel pitot tube used is designed to meet geometric configurations as defined in EPA Method 2. Sample probe calibration data forms are provided in **Appendix D**.

Chain-of-custody (COC) procedures for all stack samples was initiated and maintained as follows:

- Samples were collected, sealed and labeled with preprinted sample labels. Each isokinetic train was setup and recovered in an office trailer set up in close proximity to the RKI exhaust stack.
- Preprinted sample lists were used to check that all samples were collected and each container was checked upon completion of recovery and labeling.
- All samples were packed in bubble wrap or other absorbent material and placed in either sample coolers or appropriate DOT shipping packages (dangerous goods items). All samples were subsequently shipped via Priority Overnight FedEx service to the designated laboratory.

7.2 Laboratory Analysis QA/QC

This section provides a detailed presentation of QA/QC results from sample analysis as reported by each analytical laboratory. Key QC data related to matrix spikes, surrogate spikes, duplicate analyses, laboratory control samples (blank spikes), method blanks and/or field blank results are presented in tabular format. Other routine QC procedures followed such as calibration checks and additional method-specific protocols are described in the case narratives and analytical data packages provided in **Appendix E**. Also, unless noted otherwise, all holding times and method-specific QC criteria were met and reported results met all applicable NELAC requirements.

7.2.1 Waste Feed Streams

All waste feeds charged to the Incinerator during the MACT CPT were analyzed in accordance with Heritage-WTI's FSAP pursuant to MACT regulations and Section C (Waste Analysis Plan) of the facility's RCRA permit. Analysis and QA/QC procedures followed the approved test methods contained in these documents. Waste analysis included samples taken from all solid and liquid feeds used during the test. Solid feeds, in the form of containerized materials, were sampled prior to testing and analyzed in Heritage-WTI's onsite laboratory. Liquid feeds from storage tanks and tanker trucks were sampled during the CPT events at regular intervals. Composites of these samples were also analyzed in the onsite laboratory.

All waste analysis results and associated QC data are provided in **Appendix C** of this document. All of the analyses met the QC requirements associated with each method.

7.2.2 Stack Gas Analyses

7.2.2.1 PCDDs/PCDFs

Evaluation of the validity of the PCDD/PCDF data resultant from the analysis of the Method 0023A sampling train samples was based on the following criteria:

- Recoveries of internal, pre-spike and alternate recovery standards added to the samples prior to sampling or sample extraction.
- Results of analysis of an ongoing precision and recovery (OPR) study for the 17 PCDD/PCDF isomers listed in EPA Method 0023A.
- Results of analyses of field and method blank samples.

Results for the CFPT are presentedin **Table 6-1**. On the basis of the QC results summarized in **Table 7-1**, no sample analyses were rejected, and all data were determined to be valid.

Table 7-1 Overall QC Summary for PCDDs/PCDFs in Stack Gas Samples

QC Data Summary for the Test Program

QC Parameter	Target Criteria	Program Results
Field Blank	Below detection limit	Field blank submitted with May program
Method Blank	Below detection limit	ND for all 17 congeners
Ongoing Precision and Recovery (OPR) Study	70 – 130% recovery	All congeners within limits
Accuracy for Internal Standards (IS) and alternate recovery standard (AS)	40 – 135% recovery	All labeled standards within limits
Accuracy for pre-spike recovery standards (PS)	70 – 130% recovery	3 of 30 data points had slightly low recoveries

8.0 Continuing Compliance Methods

The HWC MACT rule requires facilities to monitor a number of process parameters to demonstrate continuous compliance with the applicable emission standards. 40 CFR 63.1209 lists all of the required OPLs that must be determined to demonstrate continuous compliance with each emission standard. 40 CFR 63.1209(b)(1) requires that a facility use CMS to document compliance with the applicable OPL.. The CMS is required to sample each regulated parameter without interruption and evaluate a detector response at least once every 15 seconds. One minute average (OMA) values are then calculated for each OPL and the appropriate rolling average (hourly or 12-hour) is calculated from the one minute values. The OPLs that have been determined to apply to WTI's hazardous waste incinerator were summarized previously in Section 2.2.4 and 2.2.6 (Tables 2-3 through 2-5) and in Section 4.3 (Tables 4-2 through 4-4).